

FACT SHEET

September 2001

Radioactive Waste Management

Introduction

Radiation occurs naturally, emanating from elements such as cesium and uranium in the earth's crust. It also comes from man-made sources such as nuclear weapons, scientific research, medical and dental industries, and can be found in the dials and gauges of various equipment. Radioactive material can move through environmental media and once a material begins to undergo radioactive decay, there is no method of stopping the subsequent emission of radiation, which may be emitted for a period of seconds to thousands of years. Since radiation is naturally occurring and moves through the environment, all plants and animals, including humans, are exposed to background levels of radiation on a daily basis.

The management of radioactive material is regulated by four separate federal agencies, the Nuclear Regulatory Commission (NRC), Department of Energy (DOE), Department of Transportation (DOT), and Environmental Protection Agency (EPA). These agencies ensure the safety of the public and protection of the environment by providing guidance on the acquisition, storage, transport, and disposal of radioactive material.

USAF Radioisotope Committee

The NRC has granted a Master Material License (MML) to the U.S. Air Force (USAF) for the management of licensed radioactive material. The USAF Radioisotope Committee (RIC) maintains the MML, issues permits, and is responsible for establishing guidance to ensure compliance with federal regulations. The daily management of radioactive material within the Air Force is governed by Air Force Instruction (AFI) 40-201, which implements federal regulations governing radioactive material.



An installation's Radiation Safety Officer(s) manages the acquisition, inventory, storage, use, transfer, and transportation of radioactive material on the installation. In addition, the Radiation Safety

Officer(s) establishes an overall installation radiation protection program providing annual radiation surveys, safety and health requirements; and assisting in waste disposal, corrective actions, and reporting of incidents.

NRC Licensed Radioactive Material

- *Byproduct Material* is any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to radiation incident to the process of producing or using special nuclear material; and the tailings or wastes produced by the extraction or concentration of uranium or thorium from ore.
- *Source Material* is any physical or chemical form of uranium or thorium, or any combination thereof. It is also any ore that contains, by weight, 0.05 percent or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material.
- *Special Nuclear Material* includes plutonium, uranium-233, or uranium enriched in the isotope uranium-233 or uranium-235, and any material artificially enriched by any of the foregoing but does not include source material.

Definitions paraphrased from 10 CFR Part 20.1003



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Radioactive Material Waste

Any activity that utilizes radioactive material produces radioactive waste, which can be in the form of a liquid, solid, or gas. The subsequent radioactive waste must be handled in the proper manner to ensure the safety and health of the general populous as well as the protection of the environment. All radioactive material and any radioactive contaminated items pending disposal must be accounted for and secured against unauthorized access.

Radioactive waste storage facilities must be permitted if storing any NRC licensed radioactive material and any non-exempt (naturally occurring) quantities of radioactive material wastes. The comingling of radioactive waste at a storage facility is prohibited; therefore, all waste stored in the facility must be from one permit, unless specifically authorized by the RIC Secretariat. Furthermore, radioactive waste may only be collected and stored for a period of one year, any additional storage time is required to have written approval from the RIC Secretariat.

Waste Disposal

Licensed and non-exempt radioactive material waste can be disposed of by several methods; however, these established disposal methods do not exempt or relieve the radioactive material licensee from complying with all federal, state, and local regulations. In addition to the disposal options discussed below, a permitted user of licensed material may propose to the RIC Secretariat an alternative disposal method not otherwise authorized.

- ➔ **Burial.** The Air Force strictly controls the land disposal of radioactive material waste. All requests for land disposal must be submitted, in writing, to the Air Force Radioactive and Mixed Waste Office, Air Force Institute for Environment, Safety, and

Occupational Health (ESOH) Risk Analysis (AFIERA).

- ➔ **Decay in Storage.** Radioactive material waste may be allowed to decay in storage, if authorized by permit conditions, for any radioactive material having a physical half-life (in storage) of less than 65 days. However, the RIC may grant authorization for disposal of radionuclides with a 120-day half-life.
- ➔ **Effluent Release.** The disposal of radioactive material waste by effluent release into a publicly owned treatment works is allowed if authorized by federal, state, and local regulations and permit conditions. For effluent disposal into a federally owned treatment works, the RIC Secretariat must grant authorization.
- ➔ **Specific Waste.** Hydrogen-3 and Carbon-14 are specified licensed radioactive material waste that may be disposed of as if they are not radioactive, provided their concentrations are 0.05 microcuries or less per gram.

Radioactive Material Reuse

The Radiation Safety Office, Wright-Patterson AFB, developed a radioactive material reuse program, which may provide an alternative to disposal. Visit <http://www.abwem.wpafb.af.mil/em/> for more information.

Mixed Waste

Licensed radioactive material waste is exempt from hazardous waste regulations by definition. However, if licensed radioactive material is mixed with non-radioactive material which is considered hazardous by listing or exhibiting a hazardous

characteristic as specified by the Resource Conservation and Recovery Act (RCRA), Title 40 Code of Federal Regulations (CFR) Part 261, then the disposal of this "mixed waste" is jointly managed by the EPA and the NRC.

The RIC provides disposal guidance regarding the radioactive components, as previously discussed, while the Base Environmental Flight manages the hazardous waste component of mixed wastes. Installations with mixed wastes

should coordinate with state regulators to ensure any additional disposal requirements are met.

Mixed Waste Office

The Radioactive Mixed Waste Office, AFIOH, provides technical coordination for all radioactive waste activities including mixed waste disposal. For more information visit the Radioactive Mixed Waste Office at http://starview.brooks.af.mil/afioh/Health%20Programs/afrmwo_frontpage.htm.

Incident Management

Incidents and accidents involving licensed radioactive material must be reported to the RIC Secretariat at DSN 297-4313 or commercially at (202) 767-4313 who reports to the NRC. Incidents must also be reported to the installation's Radiation Safety Officer(s), and the installation's Bioenvironmental Engineer.

In addition, incidents and accidents involving radioactive spills and/or emissions require additional reporting under the following circumstances:



- ➔ **Radioactive Spills** are regulated by the EPA, only if the released radioactive material or waste is listed as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance. Spills require reporting to the National Response Center at (800) 424-8802 if the release is above the established CERCLA hazardous substance reportable quantity, Title 40 CFR Part 302. Furthermore, a release would also trigger reporting under Section 304 of the Emergency Planning and Community Right-to-Know Act, Title 40 CFR Part 355.

- ➔ **Radioactive Emission** standards have been developed by the EPA under the authority of the Clean Air Act. The National Emission Standards for Hazardous Air Pollutants (NESHAP), Title 40 CFR Part 61 Subpart I, for radionuclides governs air emissions from man-made and natural sources that emit radiation from any federal agency. In accordance with AFI 40-201, generators are required to comply with both NRC and EPA radionuclide air emission regulations.

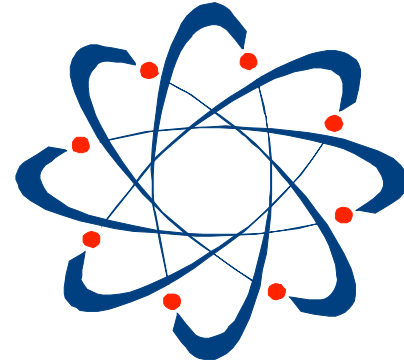
Additional Information

Air Force personnel may contact PRO-ACT or the following offices regarding radioactive material and radioactive waste.

- ➔ **Licensed Radioactive Material** contact the Radiation Protection Division, RIC Secretariat, Bolling AFB, DSN 297-4313 or (202) 767-4313.
- ➔ **Weapon Related Radioactive Material** contact the Weapons, Space, and Nuclear Safety Division, Headquarters Air Force Safety Center, Kirtland AFB, DSN 246-0441 or (505) 846-0441.
- ➔ **Radiation Safety and Health** contact the Air Force Institute for Environmental, Safety and Occupational Health Risk Analysis, Service Center, Brooks AFB, DSN 240-5454 or (888) 232-ESOH.
- ➔ **Environmental Issues** contact PRO-ACT, Environmental Quality Directorate, Headquarters Air Force Center for Environmental Excellence, Brooks AFB, DSN 240-4214 or (800) 233-4356.

Additional Information Continued...

The U.S. Environmental Protection Agency (EPA) developed the Radiation Protection Division, accessible at <http://www.epa.gov/radiation/>, which provides programs to protect people and the environment from radiation exposure. The division supports the following areas:



- **Waste Management** - provides for and supports the Mixed Waste Team, which consists of members from several EPA offices. The Mixed Waste Team offers information on the regulatory history of the Mixed Waste Rule, the rules interaction with RCRA, and current and innovative mixed waste treatment.
- **Federal Guidance** - offers federal and state agencies information on current guidance on protection from the harmful effects of radiation.
- **Technology Assessment** - provides information on innovative remedial technologies, develops guidance on effective remedial actions, and offers technical support for radiological and mixed waste contamination.
- **Site Cleanup** - offers information guidance and available scientific technology on the cleanup of radioactive contaminated sites.
- **Emergency Response** - offers information on responding to emergency releases of radioactive material, providing scientific and technical support.
- **Risk Assessment** - provides methods and models regarding radionuclide fate and transport, and dose and risk models/coefficients for radiation exposure, which supports the development of EPA policy concerning radiation protection and risk management.
- **Air Standards** - offers information on the radiation National Emissions Standards for Hazardous Air Pollutants (NESHAPs) which limits the emissions of radionuclides from specific sources.
- **Clean Metals** - provides information on the EPA's protection of human health and the environment from metals contaminated with radioactive material.

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